Classification Tree

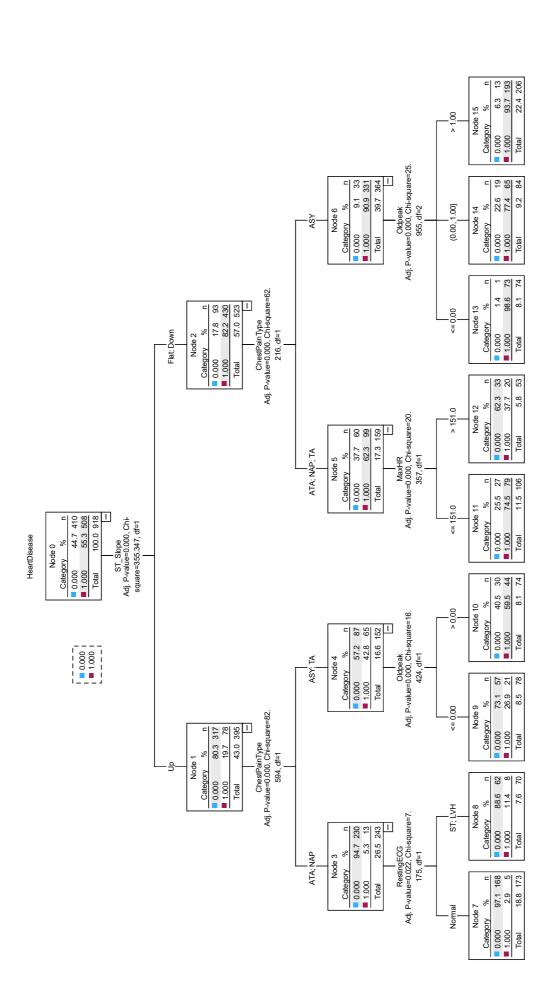**Warnings**

Gain summary Tables are not displayed because profits are undefined.

Target category gains tables are not displayed because target categories are undefined.

Model Summary

Specifications	Growing Method	CHAID
	Dependent Variable	HeartDisease
	Independent Variables	Age, Sex, ChestPainType, MaxHR, ST_Slope, Oldpeak, ExerciseAngina, Cholesterol, RestingECG, FastingBS, RestingBP
	Validation	None
	Maximum Tree Depth	3
	Minimum Cases in Parent Node	100
	Minimum Cases in Child Node	50
Results	Independent Variables Included	ST_Slope, ChestPainType, RestingECG, Oldpeak, MaxHR
	Number of Nodes	16
	Number of Terminal Nodes	9
	Depth	3

HeartDisease

Node 0

Category	%	n
0.000	44.7	410
1.000	55.3	508
Total	100.0	918

ST_Slope
Adj. P-value=0.000, Chi-square=355.347, df=1

Legend:
- 0.000
- 1.000

Up → Node 1

Category	%	n
0.000	80.3	317
1.000	19.7	78
Total	43.0	395

Flat; Down → Node 2

Category	%	n
0.000	17.8	93
1.000	82.2	430
Total	57.0	523

ChestPainType
Adj. P-value=0.000, Chi-square=82.594, df=1

ATA; NAP → Node 3

Category	%	n
0.000	94.7	230
1.000	5.3	13
Total	26.5	243

ASY; TA → Node 4

Category	%	n
0.000	57.2	87
1.000	42.8	65
Total	16.6	152

ChestPainType
Adj. P-value=0.000, Chi-square=62.216, df=1

ATA; NAP; TA → Node 5

Category	%	n
0.000	37.7	60
1.000	62.3	99
Total	17.3	159

ASY → Node 6

Category	%	n
0.000	9.1	33
1.000	90.9	331
Total	39.7	364

RestingECG
Adj. P-value=0.022, Chi-square=7.175, df=1

Normal → Node 7

Category	%	n
0.000	97.1	168
1.000	2.9	5
Total	18.8	173

ST; LVH → Node 8

Category	%	n
0.000	88.6	62
1.000	11.4	8
Total	7.6	70

Oldpeak
Adj. P-value=0.000, Chi-square=16.424, df=1

<= 0.00 → Node 9

Category	%	n
0.000	73.1	57
1.000	26.9	21
Total	8.5	78

> 0.00 → Node 10

Category	%	n
0.000	40.5	30
1.000	59.5	44
Total	8.1	74

MaxHR
Adj. P-value=0.000, Chi-square=20.357, df=1

<= 151.0 → Node 11

Category	%	n
0.000	25.5	27
1.000	74.5	79
Total	11.5	106

> 151.0 → Node 12

Category	%	n
0.000	62.3	33
1.000	37.7	20
Total	5.8	53

Oldpeak
Adj. P-value=0.000, Chi-square=25.955, df=2

<= 0.00 → Node 13

Category	%	n
0.000	1.4	1
1.000	98.6	73
Total	8.1	74

(0.00, 1.00] → Node 14

Category	%	n
0.000	22.6	19
1.000	77.4	65
Total	9.2	84

> 1.00 → Node 15

Category	%	n
0.000	6.3	13
1.000	93.7	193
Total	22.4	206

Risk

Estimate	Std. Error
.157	.012

Growing Method: CHAID
Dependent Variable: HeartDisease

Classification

Observed	Predicted		
	0	1	Percent Correct
0	320	90	78.0%
1	54	454	89.4%
Overall Percentage	40.7%	59.3%	84.3%

Growing Method: CHAID
Dependent Variable: HeartDisease

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	918	100.0
	Missing Cases	0	.0
	Total	918	100.0
Unselected Cases		0	.0
Total		918	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding		
			(1)	(2)	(3)
ChestPainType	ASY	496	1.000	.000	.000
	ATA	173	.000	1.000	.000
	NAP	203	.000	.000	1.000
	TA	46	.000	.000	.000
RestingECG	LVH	188	1.000	.000	
	Normal	552	.000	1.000	
	ST	178	.000	.000	
ST_Slope	Down	63	1.000	.000	
	Flat	460	.000	1.000	
	Up	395	.000	.000	
ExerciseAngina	N	547	1.000		
	Y	371	.000		
Sex	F	193	1.000		
	M	725	.000		

Block 0: Beginning Block

Classification Table[a,b]

		Predicted		
		HeartDisease		Percentage Correct
Observed		0	1	
Step 0	HeartDisease 0	0	410	.0
	1	0	508	100.0
	Overall Percentage			55.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.214	.066	10.422	1	.001	1.239

Variables not in the Equation

		Score	df	Sig.
Step 0	Variables			
	Age	73.023	1	.000
	Sex(1)	85.646	1	.000
	ChestPainType	268.067	3	.000
	ChestPainType(1)	245.102	1	.000
	ChestPainType(2)	148.296	1	.000
	ChestPainType(3)	41.635	1	.000
	ST_Slope	355.918	2	.000
	ST_Slope(1)	13.782	1	.000
	ST_Slope(2)	281.885	1	.000
	Oldpeak	149.796	1	.000
	ExerciseAngina(1)	224.281	1	.000
	MaxHR	147.189	1	.000
	RestingECG	10.931	2	.004
	RestingECG(1)	.105	1	.746
	RestingECG(2)	7.699	1	.006
	Cholesterol	49.726	1	.000
	FastingBS	65.586	1	.000
	RestingBP	10.626	1	.001
	Overall Statistics	528.502	15	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	667.951	15	.000
	Block	667.951	15	.000
	Model	667.951	15	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	594.185[a]	.517	.692

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Classification Table[a]

Observed		Predicted		
		HeartDisease		Percentage Correct
		0	1	
Step 1	HeartDisease	0	341	69	83.2
		1	50	458	90.2
	Overall Percentage				87.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	.017	.013	1.573	1	.210	1.017
	Sex(1)	-1.466	.280	27.463	1	.000	.231
	ChestPainType			58.073	3	.000	
	ChestPainType(1)	1.488	.433	11.839	1	.001	4.430
	ChestPainType(2)	-.342	.490	.487	1	.485	.710
	ChestPainType(3)	-.197	.446	.196	1	.658	.821
	ST_Slope			100.431	2	.000	
	ST_Slope(1)	.994	.450	4.876	1	.027	2.702
	ST_Slope(2)	2.448	.247	98.375	1	.000	11.565
	Oldpeak	.381	.118	10.324	1	.001	1.463
	ExerciseAngina(1)	-.900	.245	13.557	1	.000	.406
	MaxHR	-.004	.005	.729	1	.393	.996
	RestingECG			.654	2	.721	
	RestingECG(1)	.269	.350	.589	1	.443	1.308
	RestingECG(2)	.092	.294	.097	1	.756	1.096
	Cholesterol	-.004	.001	14.327	1	.000	.996
	FastingBS	1.136	.275	17.079	1	.000	3.116
	RestingBP	.004	.006	.487	1	.485	1.004
	Constant	-1.548	1.445	1.147	1	.284	.213

a. Variable(s) entered on step 1: Age, Sex, ChestPainType, ST_Slope, Oldpeak, ExerciseAngina, MaxHR, RestingECG, Cholesterol, FastingBS, RestingBP.

Step number: 1

Observed Groups and Predicted Probabilities

```
    80 +                                                                                    +
       I                                                                                    I
       I                                                                                    I
 F     I                                                                                    I
    60 +                                                                                    +
 R     I                                                                                    I
 E     I                                                                                1   I
 Q     I 0                                                                               1   I
 U     I 0                                                                              11  I
 E  40 + 0                                                                              11  +
 N     I 0                                                                            1  11  I
 C     I 0 0 1                                                                        111111 I
 Y     I 0 0000                                                                       111111 I
    20 + 0 0000                                                                    1  1111111+
       I00 000000                                                              1    11111111111I
       I000000000 1 0   0                                              11 11  1  1111 1   11111111111I
       I000000000000 0000 0000000000 1110001 01 1      1 1 01001 11   11 111 11110001111101111101111I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------+----------
  Prob:   0        .1       .2       .3       .4       .5       .6       .7       .8       .9        1
  Group:  000000000000000000000000000000000000000000000001111111111111111111111111111111111111111111111111

        Predicted Probability is of Membership for 1
        The Cut Value is .50
        Symbols: 0 - 0
                 1 - 1
        Each Symbol Represents 5 Cases.
```